

ATOMIC ENERGY

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Dear Sir:

New Chairman of the U. S. Atomic Energy Commission is Lewis L. Strauss. He succeeds Gordon Dean, present Chairman, who is retiring from that post as of today (June 30th). Mr. Strauss was a member of the USAEC, when it was established in 1946, leaving in 1950 to return to private business. Since March, of this year, Mr. Strauss has been a special assistant to President Eisenhower, as liaison adviser on atomic energy matters. A former partner in Kuhn, Loeb & Co., New York investment bankers, and more recently consultant on financial matters to the Rockefeller family, Mr. Strauss has been active, primarily, in the financial world.

The development of atomic weapons "to meet various service requirements" is now proceeding in Great Britain, and new tests of certain nuclear devices will be held in Australia, Duncan Sandys, Minister of Supply, stated in the House of Commons last week. These new tests will be in collaboration with the Australian Government, and will be in an isolated area of the Woomera rocket range, in South Australia, he announced.

A series of short courses in radiological health, tuition free, are being given by the Public Health Service in Cincinnati, Ohio. The courses are designed primarily to provide professional people, working in health departments and other organizations, with a working knowledge of the health hazards connected with radiation. Candidates should have a degree in medicine, engineering or the physical or biological sciences. Laboratory and lectures will cover ionizing radiation and the hazards and methods of alleviating such hazards, as encountered in using X-rays, radioisotopes, neutron fluxes, and particle accelerators. Further information may be obtained from the PHS, Environmental Health Service, Cincinnati, Ohio.

An estimate that economic industrial power, from nuclear sources, would be available "in a very few years--certainly less than ten" was made last week by Gordon Dean, retiring Chairman of the USAEC. Mr. Dean was testifying at the opening hearing in a series of public sessions that Joint Congressional Committee on Atomic Energy has begun in Washington on the subject of industrial use of atomic power. Purpose of the hearings is to develop what may lead to recommendations to the next session of Congress on changes in the Atomic Energy Act of 1946. These changes are expected to encourage activity in the nuclear field, by private concerns.

Nuclear energy will be a significant contribution to Great Britain's power sources, Sir John Hacking, deputy chairman of the British Electrical Authority, told the fifth British Electrical Power Convention at Torquay recently. He said he fully expected that in the near future Britain will go ahead with plans to consume natural uranium on a scale which will add greatly to her electrical energy supplies of 15 to 20 years hence. Sir John pointed out that world reserves of uranium, assuming 100% utilization, were many times greater than the known reserves of coal and oil.

BUSINESS NEWS...in the nuclear field...

NUCLEAR POWER PLANT URGED: A full-scale nuclear power plant using presently available materials and knowledge should be built at once, T.G. Leclair, manager of engineering, Commonwealth Edison Co., Chicago, advocated in a paper read before the American Institute of Electrical Engineers, meeting in Atlantic City, last fortnight. Mr. Leclair's paper, which was read by W. M. Kiefer, technical director of the Commonwealth Edison nuclear study project, said that his people prefer that a nuclear power plant be started now, rather than allowing development to proceed along the present lines of continually considering more economical designs of nuclear reactors to produce electrical power until one is developed on paper to compete with coal. Mr. Leclair also stated that other types of reactors now in the theory stage or awaiting the solution of accompanying problems may eventually be less economical ten years from now. He said that progress is usually made by doing rather than by theorizing and that the time will come when a plant must be built in order to meet some of the problems head on and solve them by actual operating experience. Estimates were made by Mr. Leclair that the cost of a nuclear power plant of 211,500 kilowatt capacity using a simple form of reactor, would be approximately \$78 million, excluding investment in fuel inventory. He compared this investment cost of \$370 per net kilowatt of installed capacity, with conventional power plants requiring an estimated investment of \$200 per net kw of installed capacity, and observed that the higher cost of the nuclear power plant may appear prohibitive. This can be offset, he stated, by using the plutonium produced for military purposes.

FURTHER REDUCTION IN PLUTONIUM COST ACHIEVED: Continual improvements incorporated into reactor practice and separation processes, at Hanford Plutonium Works, Richland, Washington, have been instrumental in material reductions in the unit cost of plutonium manufactured there, the USAEC recently revealed. In addition, production rates are higher than has ever before been attained. Meanwhile, Kaiser Engineers (div. of Henry J. Kaiser) are well along on a \$110,000,000 contract for the erection of buildings to be devoted to plutonium production. The Blaw-Knox Construction Co.'s chemical plants division has a \$40,000,000 contract to build new chemical processing plants, and is now bringing in a construction force for the job. Both of these projects are scheduled for completion by 1955. One of the most recent contracts let here (bid opened June 10th) was for 15 huge underground storage tanks to hold radioactive wastes material, the end product of chemical separation operations. The work will be done by Grove, Shepherd, Wilson & Kruge, Inc., Seattle, under a \$2,428,468 contract. (Operation of Hanford Works is by General Electric Co., under a cost-plus-fixed-fee type of contract. Upon completion of the present construction program there, in 1955, approximately \$1 billion will have been invested by the Government in this Hanford plant complex and supporting "company" town of Richland.)

CLOSED CYCLE GAS TURBINE CAN BE NUCLEAR POWERED, IT IS SUGGESTED: A gas turbine operated by nuclear means is a line of attack on nuclear power utilization that should be followed, Prof. Farrington Daniels recently told the University of Wisconsin's nuclear technology institute (this NEWSLETTER, V.9. No. 8). It would be a bolder approach, he admitted, but since the gas turbine is efficient only at very high temperatures, this would fit in with the nuclear reactor which is peculiarly suited to high temperatures. Ordinary gas turbines, he noted, operated by the burning of fuel, have to be resistant to the oxygen used for chemical combustion of the fuel. An inert gas, such as nitrogen or helium, can be circulated through a nuclear reactor and gas turbines, using a closed cycle. He said it may be theoretically possible to find materials of construction which can go to higher temperatures than are now possible in gas turbines, providing that these materials do not have to come in contact with oxygen. In order to use these very high temperatures, Dr. Daniels stated, it will probably be necessary to eliminate the metallic enclosures of the nuclear fuel which are now used to prevent radioactive materials from leaving the nuclear reactor. This would mean that to take advantage of very high temperatures it would be necessary to take a "calculated risk". The risk would entail contamination of the turbine, so that repairs would have to be made by remote control, and the turbine would have to be capable of operating for a long time without any attention or repairs.

NEW PRODUCTS, PROCESSES & SERVICES...in the nuclear field...

PRODUCTS FROM THE MANUFACTURERS: Model 100 Pulse Height Analyzer is a completely self-contained instrument which allows data from random occurring pulses of various heights to be recorded in ten channels simultaneously; no other equipment is needed. In the discriminator section, a unique feature is the gate circuit provided so that the ten channels may be used to count only those pulses which are either coincident or anticoincident with pulses from another source. As to the counter: the phototube is RCA 5819 protected in MuMetal shield. A cathode follower is incorporated for maximum stability and simplicity, while large phosphors, canned sodium iodide, anthracene or other types of crystals may be used. In the amplifier pulse generator section, a 60-cycle pulse generator is provided for accurate calibration of the analyzer. The amplifier consists of two stages, each stage being a ring of three feedback simplifier, with a high degree of stability. In the scaler section, all registers are reset by a single operation. Resolving time is said to be less than 5-microseconds to pulse pairs, while register speed is said to be 15 counts per second for evenly spaced pulses. High voltage control is achieved with a ten turn Helipot for accurate high voltage settings.--Radiation Instrument Development Laboratory, Chicago 36, Ill.

Five new nuclear instruments are now offered by this manufacturer: Model SG-1A Scaler gives pre-set count and pre-set time operation together with an anti-over-loading amplifier and a 2500-volt power supply. It is also available with a 5000 volt power supply. Model RM-1A Ratemeter is designed to give accuracy and stability over a wide range of counting rates. Model AP-1A Pulse Amplifier is a general purpose anti-overloading amplifier said to be of high sensitivity, which is recommended for all types of counting not involving pulse height analysis. Models HV-1A and HV-2A High Voltage Power Supplies are said to be capable of providing the stability and wide voltage range used in nuclear research. --Utting Associates, Inc., Newton 58, Mass.

NEW SERVICES OFFERED: A Film badge service for improved personnel protection (and which is similar to that being discontinued by Oak Ridge National Laboratory) provides interpretation of gamma radiation from 150 Kev to 20 Mev over a range of 50 mr to 500 r. The service supplies film packets on a weekly basis or on any regular basis convenient to the user. Said to be an exclusive feature, is the provision for measurement of accidental exposure to large amounts of activity by means of a high range catastrophe film which is processed in the event of blackening of lower range film. After development, all films are returned to the user together with the interpretation and a written report. --Nuclear Instrument & Chemical Corp., Chicago 10, Ill.

PROCESSES: Results of research undertaken by Foster D. Snell, Inc., in a two-year program devoted to this task, show that sequestering agents offer the best means for decontaminating radioactive surfaces after an atomic bomb explosion. Efforts were devoted by the Snell laboratories, in this program, to find the most effective and economical means of decontaminating surfaces in the home as well as in industrial installations, buildings, and highways. Fission products supplied by Oak Ridge National Laboratory were used in the investigation. These were incorporated into a synthetic soil representative of the dirt found by analysis in the air over industrial cities. This soil was applied to surfaces of tin, glass, cement, gypsum plaster, painted and unpainted wood, cotton cloth, and a shaved rabbit skin. When the deposit had dried, it was cleaned using commercial soaps, light-duty synthetic detergents, and heavy-duty detergents. The heavy-duty detergents were generally more effective than either light-duty detergents, or soaps, as determined by measurement with a Geiger counter. This led to the testing of sequestering agents, which are effective in isolating many elements. Sequestrants investigated included ethylenediamine tetraacetic acid, pyrophosphates, tripolyphosphates, as well as citrates. The most economical of all to use for decontaminating purposes was found to be a modified form of sodium hexametaphosphate. When used in a solution consisting of two parts sequesterant, with one part of either soap or synthetic detergent, and applied in a 1% water solution, removal of radioactive contaminants from nearly all surfaces was almost complete. From frosted glass, the sequesterant solution removed 98.8% of all contamination, against 47% removal by water, and 81% removal by 1% soap solution.

RAW MATERIALS...radioactive minerals for nuclear work...

UNITED STATES: Colorado- The uranium boom in the Colorado Plateau area continues to grow. In scope of operations, it is said to surpass any similar mineral search in the history of the world. In addition to private companies spending over \$3 million a year on drilling alone, the Government itself is engaged in a tremendous drilling program through various contractors. Mining activities are also at an all-time high. In the Plateau area, there are well over 200 mines in operation. It is estimated that more than \$30 million a year is currently being spent for the mining and refining of uranium ores in the Colorado Plateau, with almost 5,000 people now taking part in this phase of the atomic energy program.

CANADA: A discovery of uranium made in Ontario, by Peach Uranium and Metal Mining, Ltd., has been kept almost a secret, since April, when the company's strike was made. Diamond drilling along a length of 3,250-ft., near the center of a 50-claim group, has indicated an over all average of 0.13% uranium oxide across an average width of 9.0-ft. At present market values, this represents some \$18.85 per ton. Assays have all been by chemical means, and show the mineralization to be finely disseminated pitchblende. The showing is unusually accessible. It is in the southeast part of Long Township, about 4-miles east of Algoma, between Sault Ste. Marie and Sudbury. While news of the finding has been kept almost a secret, as mentioned, many adjacent claims have already been staked. Preston East Dome has acquired ground almost adjoining; other contiguous ground has been acquired privately by people associated with Peach Uranium. Other companies staking nearby include Fundy Bay Copper, with 36-contiguous claims adjoining the north boundary of Peach. In the area, too, Jarvis Deep Prospecting Syndicate has staked nine claims; McCombe Mining & Exploration, 18 claims; and Minerva Mining Corp., 50-claims....Reviewing the operations of Rix-Athabasca Uranium Mines, an official of Technical Mine Consultants states that recent crosscutting by Rix-Athabasca from the west drift on the first level has indicated a width of at least 50-ft. of excellent grade. On the second level west drift, a 45-ft. length has been opened, averaging 3.4-lbs. of uranium oxide (\$24.65 per ton).

NEW BOOKS & OTHER PUBLICATIONS...on nuclear subjects...

Chemical Systems Sensitive to Radiation. Work done by Tracerlab, Inc., under Government contract. Ten reports, which were made monthly from Nov. 1st, 1951, to August 31st, 1952 are now available. These reports cover investigations into a system that appears to hold some promise as a dosimeter, i.e., solutions of acrylonitrile in water with varying concentrations of monomer. They are available in microfilm at \$1.75 or photostat at \$2.50 (per report)....Antibody Response of Animals exposed to X-radiation, by J. D. Fulton and R. B. Mitchell. Biological and Medical Aspects of Ionizing Radiation, by K. H. Burdick and G. O. Ballengee. Work done at School of Aviation Medicine, USAF, Randolph Field, Tex. Available at \$1.25 in microfilm or photostat at \$1.25 (per report). Above reports obtainable from Library of Congress, Publication Board Project, Wash. 25, D.C.

Effect of Angle of Incidence upon Penetration of Gamma Radiation, by E. H. Bebb, R. H. Vogt, and W.R. Faust. Work done at U. S. Naval Research Laboratory, Washington, D.C. Mimeographed: 50¢ per copy. Available from Office of Technical Services, Wash. 25, D.C.

NUCLEAR WORK OUTSIDE THE UNITED STATES...news and notes...

NEW ZEALAND: The construction of a £ 5 m. plant to produce electricity and heavy water has been approved by the Government, the Minister of Works, Mr. W. S. Goosman, has stated. He said electricity and heavy water would be produced by using geothermal steam in the Wairakei area of North Island. The heavy water will be supplied Britain for use as a moderator in nuclear reactors.

INDIA: The Atomic Energy Order (1953) now gives the Government of India control over the production and use of many additional minerals. (The Atomic Energy Act of 1948 had given the Government here powers over such minerals as uranium, thorium etc.) These new minerals now put under government control include columbite, samarskite, uraniferous allanite, monazite, uranium bearing tailings left over from ores of extraction of copper or gold, ilmenite, rutile, zircon, and beryl.

ATOMIC PATENT DIGEST...latest U. S. grants in the nuclear field...

Point electron source. Comprises, in part, a concave surface formed of poor electron emitting material, this concave surface having an aperture in its center; an electron emitting element within this aperture; an activating material about this electron emitting element; and means to continuously volatilize this activating material and cause it to flow over the electron emitting element. In this manner, an electron emission surface is formed on the electron emitting element and is defined by the edges of the aperture in this concave surface. U.S. Pat. No. 2,640,950 issued June 2, 1953; assigned to United States of America (USAEC). (Inventor: L. J. Cook.)

Radiation current source. An apparatus for supplying minute currents over a wide range. Comprises, in part, the combination of a substantially cylindrical, gas filled, hermetically sealable chamber, a source of charged particle radiation axially disposed in this chamber, three electrodes mounted in the chamber, and means whereby radiation emitted from this source produces ions in the chamber which are collected by two of the electrodes and intercepted by means of the third electrode. U.S. Pat. No. 2,640,953 issued June 2, 1953; assigned to United States of America (USAEC). (Inventor: H. H. Rossi.)

Radiological gas analysis. Comprises, in part, the steps of establishing two electrical fields of substantially equal constant potential in two separate zones; flowing a gas of known composition through each of these zones while maintaining the gas at substantially equal constant pressures; subjecting the gas in these two zones to beta radiation of substantially equal constant intensity; and while maintaining constant conditions of pressure and radiation substantially as before, combining the ionization currents produced in the two chambers in opposition to each other, and determining the composition of the unknown gas by measuring the resultant current. U.S. Pat. No. 2,641,710 issued June 9, 1953; assigned to Shell Development Co., Emerville, Calif. (Inventors: D.J. Pompeo, and J. W. Otvos.)

Multi channel analyzer for determining pulse distribution. Comprises, in part, a window amplifier for selecting pulses within a predetermined voltage spectrum, a pulse lengthener fed by the amplifier for sustaining the crest of the pulses, a series of parallel connected discriminators coupled to the pulse lengthener, and means for scaling pulses from these discriminators. U.S. Pat. No. 2,642,527 issued June 16, 1953; assigned to United States of America (USAEC). (Inventor: G.G. Kelley.)

In a radio-frequency oscillator, in part, the combination comprising a vacuum tube, the grid and filament of which have a parallel connected resistor and capacitor connected there between; a series connected first inductance and first capacitance connected between the grid of the tube and a neutral point; a series connected second inductance and second capacitance connected between the filament of the tube and a neutral point; and means connected to the filament for rendering it electron emissive, and means connected to the anode for rendering the tube conductive. U.S. Pat. No. 2,642,531 issued June 16, 1953; assigned to United States of America (USAEC). (Inventor: W. R. Baker.)

Geiger tube circuit with cathode follower. In a signal transfer having at a first location a signal producing Geiger tube, and a signal utilization device at a second location remote from the first, and a low characteristic impedance coaxial line with an inner and outer conductor linking these locations, the combination comprising: a high impedance resistor directly connected between the inner conductor and the Geiger tube anode, a cathode follower at the first location, a high voltage direct current energy supply at the second location, and a line impedance matching resistor and a capacitor solely coupling, respectively, the supply and device to the inner conductor, with the outer conductor of the coaxial line providing a return path for currents flowing through the inner conductor. U.S. Pat. No. 2,642,539 issued June 16, 1953 to Samuel W. Lichtman, Oxon Hill, Md.

Sincerely,

The Staff
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